UNPUBLISHED
SURVEY & CONTROL
REPORTS

INTERMOUNTAIN STATION
Central Reference File
No. 3.4163-31

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

THE PREDICTION OF TREE MORTALITY FROM 1955 ENGELMANN SPRUCE BEETLE INFESTATIONS IN REGION ONE

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U. S. Forest Service
Ogden, Utah

November 12, 1954

M--5123

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INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION FOREST SERVICE
COEUR D'ALENE, IDAHO

David O. Scott, % George Weyermann Nov. 12, 1954
Flathead National Forest

Philip C. Johnson, Acting Leader, Coeur d'Alene Research Center

RX, INT, TREE-KILLING BARK BEETLES, Reports, Region One Engelmann Spruce Beetle

Enclosed are several copies of a small report suggesting a possible procedure for the prediction of tree mortality from 1955 Engelmann spruce beetle infestations in Region One. The formula makes use of data now contained in your Form C for each compartment now infested by the spruce beetle. The formula also contains provision for information on logging and trap trees which national forest personnel have for each compartment. We trust that, with this information, it will be possible to complete the final columns on Form C giving the predicted 1955 spruce beetle mortality volume. David McComb of this research center plans to be in Kalispell next Tuesday, and he has been instructed to contact the staff man of the Flathead Forest, including Clarence Brown, if he is still there, to give any help he can in the use of the formula.

Predicting the 1955 tree mortality by any means is somewhat hazardous. We feel that the formula may reduce to a minimum the possibilities of wide deviation in the 1955 mortality predictions. The formula has been given a trial here today on a number of spruce compartments, and it appears to yield fairly consistent results and predictions that appear to be realistic.

Enc.

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UNITED STATES DEPARTMENT OF AGRICULTURE
Forest Service
Intermountain Forest and Range Experiment Station
Ogden, Utah

THE PREDICTION OF TREE MORTALITY FROM 1955 ENGELMANN SPRUCE BEETLE INFESTATIONS IN REGION ONE 1/

The Coeur d'Alene Research Center has been asked to prepare guide lines to assist national forest administration in predictions of the amount of spruce timber which might be killed by the Engelmann spruce beetle in Region One beetle-infested areas in 1955. Inasmuch as there is no experience upon which to base such predictions, they necessarily must rely on an interpretation of 1) the severity of the infestations since their inception in each national forest management compartment and 2) the net effect of any applied control measures such as infested tree logging or the use of trap trees.

To facilitate this interpretation, a formula has been derived as an aid in supplying the information needed in the columns headed "July 1, 1955 - June 30, 1956" in Region One Form C (August, 1954) entitled "Spruce Compartment Inventory Summary By Years."

1/ Compiled by T. T. Terrell, David McComb, and Philip C. Johnson

M = (g + a + l + t)

M = Predicted spruce volume killed by beetles in 1955.

= Algebraic sum of "plus" or "minus" symbols substituted as values for g, a, l, t.

g = Percentage of original (prior to current beetle outbreak) spruce volume still green.

a = Percentage of original spruce volume attacked in 1954.

l = Infested tree logging conducted since June 1954.

t = Trap trees left untreated as of November 15, 1954.

Derivation of Symbols

Symbols	g	a	l	t
++	90 - 100	10.0 +		many
+	65 - 89.9	5.5 - 9.9		yes
0	50 - 64.9	4.5 - 5.4	no	no
-	40 - 49.9	2.5 - 4.4	yes	
--	0 - 39.9	0 - 2.4		

Substitute plus or minus symbols for corresponding values of g, a, l, and t in the formula from the tabulation "Derivation of Symbols." The algebraic sum of the symbols are then converted into values indicating the ratio of 1954 beetle-caused spruce mortality to 1955 mortality, as follows:

	Ratio	
	1954 mortality	1955 mortality
+++	1.0	2.0
++	1.0	1.5
+	1.0	1.0
0	1.0	0.5
-	1.0	substantial decrease
--	1.0	" "

The 1954 infested spruce volume can be multiplied by the appropriate 1955 mortality ratio above to arrive at the predicted 1955 infested spruce volume in each national forest compartment. It is believed that the predicted volumes will be reasonable in most cases, although admittedly some will deviate from the volume that may eventually be killed in 1955.

Coeur d'Alene Research Center
Coeur d'Alene, Idaho
November 12, 1954